Acquisition versus Retention:
Competitive Customer Relationship Management

Niladri B. Syam • James D. Hess

Department of Marketing,
C.T. Bauer College of Business, University of Houston,
4800 Calhoun Road, Houston, TX 77204
713 743-4568
nbsyam@uh.edu • jhess@uh.edu

March 21, 2006

Acquisition versus Retention:
Competitive Customer Relationship Management

Abstract: Customer relationship management suggests that sellers identify their most valuable customers and provide special products/services to them, either immediately in an effort to build a sense of commitment to the firm (an acquisition strategy) or just as they are thinking of leaving (a retention strategy). While a monopolist profits most from an acquisition CRM strategy, assuming costs are held constant, the main result of our analytic model is that in a competitive marketplace one firm pursues an acquisition strategy and its rival uses a retention strategy. A critical ingredient in this finding is exogenous and identical customer churn rates. A retention strategy leads to a relatively smaller committed "buyer club," so it leads to a net windfall gain from customer churn. While a monopolist should choose acquisition CRM, when there is competition a first mover should choose retention CRM. The rival firm is forced to differentiate by choosing the less profitable acquisition strategy. Further, a retention strategy asks the customers to trust that special services will be provided eventually. We find that both the firm pursuing a retention strategy and its customers are better off when the churn rate is lower, so this trust is rewarded. Finally, if acquisition CRM eliminates customer churn by creating early feelings of delight, then an all-acquisition outcome can be the competitive equilibrium.

Key Words: customer relationship management; acquisition; retention; game theory.

1. Introduction

Customer relationship management (CRM) can be defined as the process of separating a firm's high-value and low-value customers for the purpose of providing them differential levels of service (Blattberg and Deighton 1996). Harrah's Entertainment, for example, splits its "Total Rewards" cardholding casino customers into tiers based on their predicted value and provides each tier different services (Loveman 2003). Many airline frequent-flyer clubs are premised on the same underlying logic, and industry consultants advise companies to divide their customer base into groups, ranging from the most lucrative, with whom they should broaden and deepen relationships, to the least lucrative, who they may not wish to serve at all (Rigby, Reichheld, and Shefter 2002).

Despite the explosion in the practice of relationship marketing, many questions about CRM practices continue to be debated in academic journals (Shugan 2005). Though most CRM practices involve special treatment of a firm's more valuable customers (Fournier, Dobscha, and Mick 1998; Winer 2001; Rigby and Ledingham 2004), it is unclear when these special services ought to be provided. Should firms provide special service early on to increase the number of customers it attracts or later on to enhance its ability to keep the consumers already attracted? We define an early provision of rewards to attract customers as an acquisition strategy and a later provision of rewards to keep customers from dropping the seller as a retention strategy, analogous to Shugan's (2005) dichotomy of "customer assets" and "customer liabilities." If special services are to be provided in the future, the firm is asking the customer to trust it, rather than showing trust in the customer (Shugan 2005). Is that strategically wise? In short, should CRM focus on retention or on acquisition strategies?

While these questions are important to address for a sole CRM-oriented firm in a market, they become critical when rival firms compete using CRM strategies. While academic research has increasingly investigated relationship marketing (Morgan and Hunt 1994; Reinartz and Kumar 2000, 2003; Verhoef 2003), there has been very little research on the effects of CRM when all firms in an industry adopt it. In fact, in the introduction to the 'Special Section on CRM' in a recent issue of the *Journal of Marketing*, Boulding et al. (2005 p. 161) note that, "We find it surprising that the CRM literature and the articles in this special section are largely silent on the issue of competitive reaction." Our objective is to answer the question, "How does competition between sellers determine whether and under what conditions acquisition-oriented CRM and retention-oriented CRM strategies are adopted?" In this paper, we build an analytical model that allows us to investigate the use of retention or acquisition CRM as a competitive strategy.

Most industry analysts and academics recommend that firms focus on retention rather than on acquisition (e.g., Thomas, Reinartz, and Kumar 2004). They argue that the cost of retaining existing customers is considerably lower than the cost of acquiring new customers (Hart, Heskett and Sasser 1990; Reichheld and Sasser 1990). However, systematic empirical evidence of this is meager (Sharp and Sharp 1997; Dowling and Uncles 1997; Reinartz and Kumar 2000; Dowling 2002). Blattberg and Deighton (1996) point out that in some industries the low intrinsic retainability of customers makes retention strategies ineffective. Lack of retainability of customers, resulting in customer "churn," is pervasive, and a recent McKinsey study reveals that the annual churn rate in the wireless industry increased from 17% in 1995 to 32% in 2000 (Ayers 2003). Thus, churn is important in relationship marketing, and we

investigate the strategic effect of consumer churn under CRM competition, setting aside issues of cost.

What about the consumer? Some researchers have questioned the viability of relationship marketing by arguing that it may not be in the customers' interest to form exclusive relationships with firms (Fournier, Dobscha, and Mick 1998; Day 2000). In particular, a retention strategy involves future rewards and so requires customers to trust the firm to actually provide such benefits. Can this be consistent with a consumer's self-interest? On the other hand, if the seller provides immediate services in hopes of future sales, the seller exposes herself to opportunistic buyers who take today's promotion with no intention of returning in the future.

What does the theoretical model suggest as answers to the above questions and what is the intuition behind the answers? Let us foreshadow the findings that will be derived in the analytic model.

Consider a monopolist who can provide extraordinary goods and services now and merely adequate goods and services in the future, or vice versa. In addition, some customers have unanticipated bad experiences or changes of heart and as result disappear from the marketplace in the future (customer churn). If the monopolist provides extraordinary goods and services in the future (a retention strategy), it will be able to charge differentially high prices in the future compared to now. If the monopolist provides extraordinary goods and services now (an acquisition strategy), it must charge lower prices in the future to prevent customers from opportunistically exploiting the situation by dropping out later. As a result, churn is more financially damaging to a monopolist that uses a retention strategy. Setting aside issues of costs, this leads to the conclusion that the optimal time to provide extraordinary goods and services is now: the optimal CRM strategy for a monopolist is acquisition, not retention.

Though acquisition CRM is preferable to retention under monopoly, should all firms in a competitive market adopt acquisition? No. In equilibrium, competing duopolists differentiate their CRM strategies, with one firm adopting retention and its rival adopting acquisition. Thus, ex-ante symmetric firms adopt asymmetric strategies in equilibrium. This finding resonates with the finding in McGahan and Ghemawat (1994 p.175), where the authors note, "Blanket injunctions to all firms to increase retention rates are misguided."[1] Furthermore, although the same churn rate applies to both the acquisition- and retention-oriented CRM firm, churn hurts the retention-oriented firm less because an acquisition-oriented seller firm has a larger "buyer club," from which the churn originates. In a competitive market, customers that churn from one firm take their purchases to the other, so the retention-oriented seller gets a net windfall of customers in the population of churning customers. The smaller club of a retention firm is a differential advantage in competition. Counter to intuition and to the speculation in the literature (Blattberg and Deighton 1996) if there is competition, then a retention-oriented CRM firm can use churn — the low intrinsic retainability of customers — to its relative advantage.

Finally, we show that the retention-oriented firm's customers obtain higher consumer surplus if the churn-rate decreases. Lower churn rates are reflected in a lower first-period price, and this has a positive impact on consumers' well-being. In the limit, as churn becomes negligible, *both* the retention-oriented seller and its consumers get maximum benefits (profits and consumer surplus, respectively). As a consequence, we provide an economic rationale for relationships between consumers and firms: a lower tendency to churn is rewarded by the current supplier through lower prices. Interestingly, this may allay some concerns that retention strategies, by promising only future benefits, demand higher levels of trust from consumers.

[1] McGahan and Ghemawat (1994) do not investigate the distinction between acquisition and retention CRM strategies. Their results are driven by asymmetric firms, while we have symmetric firms in a market with churn.

2. Elements of a Model of Customer Relationship Management

Some characteristics of our model are common to most duopoly models. For example, each customer has a differential attraction to each seller's product, and this degree of attraction varies uniformly within the population of customers. Each consumer makes purchase decisions based upon consumer surplus computed as the utility of the goods and services minus the price paid. Our dynamic model includes just two time periods, "now" and "future" periods, all actors precisely foresee the future, and for analytic convenience we assume a zero time-discount factor.

Other characteristics of our model are unique to customer relationship management. First, a CRM seller offers services to the best customers to solidify their affiliation with it; it forms a "buyer club" (**club**, for short) and divides its customers into club and non-club members. Second, club members become long-term prospects, in the sense that they become repeat buyers. Customers who do not get the club services do not repeat their purchase in the future. Third, customers churn – that is, they switch from one CRM seller to another due to exogenous factors associated with the consumption experience. Fourth, beyond the issue of dividing customers into club and non-club members is the issue of the form and timing of special services to club members. The timing of special services causes CRM sellers to strategically focus on either acquiring customers or retaining existing customers (now or in the future, respectively). The primary aim of this paper is to analyze the competitive use of acquisition versus retention CRM.

The specific model ingredients are as follows. Suppose that two firms – denoted C and D – want to sell a product, and customers perceive these sellers as being different along some attribute dimension. A specific customer might want this attribute to be at an ideal point x, but perceives C and D as having attributes 0 and 1. Customer heterogeneity is captured in the usual Hotelling way by assuming that the ideal points x are distributed within the population uniformly

across the unit interval [0, 1]. Consumers with ideal points near 0 are more allied with seller C's product and those with ideal points near 1 are more allied with seller D's product. The consumer surplus of the typical buyer of C is $U - x - P_{Cb}$, where $U - x$ is the utility of C's *basic product* and P_{Cb} denotes its price. For seller D, the consumer surplus of the typical consumer is $U - (1-x) - P_{Db}$.

When a firm implements a CRM system, it performs services S for some of its customers (Day 2000, 2002; Ayers 2003). Because these services augment a product that is not perfectly ideal, we assume that a typical consumer's incremental utility from the service from seller C is $S-Sx$ and from seller D is $S-S(1-x)$.[2] A customer who has been offered the *augmented product* of the CRM system of seller C has a consumer surplus $U-x+S(1-x)-P_{Ca}$, where P_{Ca} is the price for the augmented product. The comparable surplus from seller D is $U-(1-x)+Sx-P_{Da}$. The dichotomy of the basic and augmented products captures the institutional reality that some consumers do not want to form any special relationship with a firm, and want to continue buying the basic product. Throughout the paper we will assume that $U>1$ and $S>1$ so that all customers value the product and service enough to remain in the market.

To help interpret the model, suppose that the two sellers are airlines and that the basic product is a flight from New York to Los Angeles. Seller C's flight leaves at 8:00 in the morning and seller D's flight at 12:00 noon. Passengers would prefer different departure times and their ideal times are uniformly spread between the 8:00 and 12:00 flights. When the basic flight is augmented, the seating is upgraded from economy to business-class. Consumers value the upgrade, but the earlier or later the flight compared to their ideal departure time, the less valued

[2] Since the service part of product augmentation is meant to treat consumers as special, we assume that any shortcoming in the service hurts the consumers more than shortcomings in the basic product. Thus evaluations of the product and service could be $U-x$ and $S-\tau x$, $\tau>1$. To minimize notation we just assume $\tau=S>1$.

is the upgrade; mistiming of the basic product casts a shadow over the more comfortable seating. Said differently, the upgrade itself is most appreciated when the flight departs at the ideal time.

We assume that customers who get the extra service of the augmented product develop a special affiliation with the product and will repurchase from the firm in the future, but those who do not get such service drop out of the market. This behavior of customers is similar to the heavy-user and light-user segments in Kim, Shi and Srinivasan (2001). Another way to think about the drop out of the basic product buyers from the market is that firms may not want to form long-term relationships with low-value customers. There is considerable evidence of this practice and a recent article in *Advertising Age* (Neff 2005 p. 1) notes that "Delta is one of the growing numbers of marketers punishing penny-pinching brand loyalists and instead embracing more profitable customers." This article notes that firms are likely to discontinue products favored by the cherry-pickers to make way for those that are favored by their better shoppers. A similar observation has been made in analyzing competition between MCI and AT&T (Hart et al. 1990; Reichheld and Sasser 1990).

With repeat purchases in mind, we assume that there are two time periods, t=1,2, interpreted as "now" and "future" (cf. McGahan and Ghemawat 1994). Seller C anticipates that if its CRM system identifies a customer of type x as a good prospect and provides the service-augmented-product each period at prices P_{C1} and P_{C2} that it may sell twice to this customer. However, if the customer is sold only the basic product now, the customer drops out of the market in the future, as seen in Figure 1.

A consumer who has joined one seller's club may have a change of heart and switch affiliation in the future. We refer to this attrition of customers as "churn." Churn may be caused by dissatisfaction with the product, a change in the customer's personal situation (new

geographical location or demographics), or a realization that they wanted something different (see, e.g., Syam, Krishnamurthy and Hess [2005] for a model on miswanting). In this paper, we assume that customer attrition is a characteristic of the consumers. Specifically, in the second period, a fraction χ of consumers will reverse their ideal attribute level. Such a customer with ideal point x will switch to an ideal 1-x, so that customers that had a preference for seller C (x near 0) will have a preference for seller D (adjusted x near 1 as seen in Figure 1). A fixed fraction 1-χ of customers will remain with their club, but the remainder will exogenously switch their preferred seller.

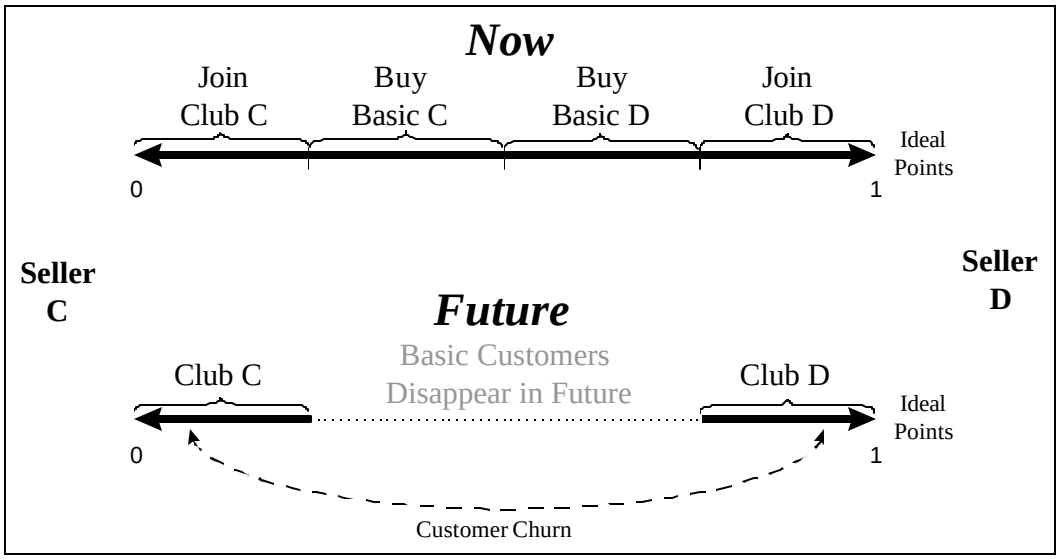

Figure 1: CRM Consumer Segments, Now and Future

Though our assumptions about the CRM model are taken from an observation of fairly common CRM practices, there are a wide variety of such practices among firms. The main goal of this paper is to pit the acquisition and retention strategies against each other, and we have made the same assumptions about the firms and consumer behavior for both these strategies.

A CRM seller can put special effort into inducing a person to buy now or can delay these special efforts until the future. We call the former approach an "acquisition" strategy and the

latter a "retention" strategy. Though special rewards can be provided in various ways, many academics and practitioners have suggested individually tailoring the consumption experience to build a relationship between the firm and customer. For instance, "Customizing services to meet the needs of individual customers is probably closer to the concept of loyalty and a relationship" (Shugan 2005, p. 189). Lewis (2005, p.230) argues that, "An important corollary to this concept [that CRM treats customers as economic assets] is that firms should identify their most profitable customers and then customize marketing on the basis of customer asset value." In fact, a perusal of the special section on CRM in the *Journal of Marketing* (October 2005) reveals that many authors from academia and practice argue that the goal of CRM is to personalize the consumption experience for consumers (Jayachandran et al. 2005; Mithas, Krishnan, and Fornell 2005; Payne and Frow 2005; Rogers 2005).[3]

In this paper, the special effort is modeled as personalization (Dewan, Jing and Seidmann 2003; Syam, Ruan and Hess 2005). Specifically, the seller i=C, D redesigns the product and service to match the customer's ideal, and consumer surplus becomes $U+S-P_{it}$, where P_{it} is the i^{th} firm's club price at time t If this is done now (t=1), it is an acquisition strategy that shifts customers from one-time buyers to life-time buyers. If it is done in the future (t=2), it is a retention strategy that prevents buyers from dropping out of the market at the last minute. Given that the special effort customizes product and services, it is assumed that the sellers can identify the ideal point x for each consumer from an analysis of its "house file" database.

It is important to note that the separation of consumers into club and non-club members is a necessary pre-requisite for any CRM, distinct from the issues of what special service to provide

[3] In practice, firms often offer gifts, coupons etc. to their best customers, but when these incentives are disconnected from the core benefit that consumers seek (a better basic product), the firms are not realizing the true potential of relationship marketing. This potential lies in eliciting, storing and using customer information to create individually tailored products that a rival firm cannot emulate (Rogers 2005).

club members and when to provide them. The special service modeled here is personalization, and the timing of the special service depends on the firm's choice of an acquisition or a retention strategy. The personalization itself does not determine the club membership because that would require the firm to offer special service to all its customers, leaving the customers to self-select into wanting the personalized or the basic product. This scenario has the flavor of a product-line problem (Syam and Kumar 2005) rather than that of relationship marketing where *only* the high-value customers are eligible for special service.

Finally, we assume that clubs admit only consumers who buy in both periods. That is, opportunistic consumers (who take advantage of special introductory offers but then stop buying in the future) are excluded from the seller's club. This opportunistic behavior of consumers has been treated elsewhere in the academic literature as the problem of 'adverse election' (Cao and Gruca 2005). These authors note that adverse selection is an important problem for marketers, and that it involves unprofitable customers who buy only when deep discounts are offered and then defect before the acquisition and other up-front costs are recovered.

To set up our notation and to set a baseline, we begin with a model of a single firm. Once that is accomplished, we formalize the interaction between firms and customers as a two-stage game. In the first stage the firms choose their acquisition or retention CRM strategies and form their buyer clubs. If a firm is focused on the strategy of acquiring customers, it offers personalized augmented products in the first period to acquire as many customers as possible. A firm that is focused on retention, on the other hand, will personalize the augmented product in the second period to maximize retention of customers in its club. In the second stage, firms simultaneously set prices of the base product and the augmented product. Finally, customers make their product choices.

3. Baseline Model: Monopoly Acquisition versus Retention CRM

In order to provide a benchmark for the focal competitive case, we start by analyzing a monopoly model. This will also help to clarify the main strategic forces that drive our model of CRM competition which is considerably more complex. Suppose firm C is the monopolist and it decides to adopt relationship marketing by pursuing either an acquisition strategy or a retention strategy. We will analyze the prices and profits when firm C adopts these strategies. Though we use the notation P_{it} to denote the price of the augmented product for firm i={C, D} in period t={1, 2} elsewhere in this paper, for the sake of notational simplicity in this section we will denote these prices for C as P_t. The price of C's basic product is P_b.

With this notation, consumer surplus (utility minus price) for two-period club membership is $CS_{12}=2(U+S)-x-Sx-P_1-P_2$. Notice that utility can be expressed equivalently as $\{U-x+S(1-x)\}+[U+S]$ or as $[U-x+S(1-x)]+\{U+S\}$, where the expression in curved brackets is period 1 utility and the expression in square brackets is period 2 utility. It does not matter whether the personalization is in period 1 or 2, since the aggregate utility is identical. Consumer surplus for the basic product is $CS_b=U-x-P_b$.

When the ideal x is smaller than the threshold $X_b=U-P_b$, the consumer will buy at least the basic product from seller C (located at 0 in the Hotelling line). When x is smaller than the threshold $X_{12}=\frac{U+2S-(P_1+P_2-P_b)}{S}$, the consumer prefers to join the club and buy in both periods (see Figure 2).

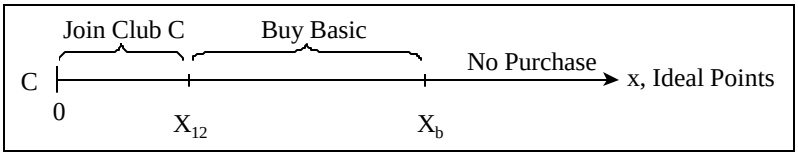

Figure 2: Monopoly Market Segmentation

Notice that demand for club membership depends only on the difference between membership and the basic product prices, which we call the price of club membership and denote $P_m \equiv P_1+P_2-P_b$. That is, the consumer who wants to join the club both buys the basic product P_b and pays a club membership price P_m. The demand for the basic product is a linear function of the basic price, $X_b(P_b)$ and the demand for club membership is a linear function of the membership price $X_{12}(P_m)$.

If we set aside costs in this monopoly section, profits are

$$\begin{aligned}\pi &= (P_1+P_2)X_{12}+ P_b(X_b-X_{12}) = [P_1+P_2-P_b]X_{12} + P_bX_b \\ &= P_mX_{12}(P_m) + P_bX_b(P_b).\end{aligned} \qquad (1)$$

Because all consumers can be sold the basic product, if the seller induces them to the club, there is an opportunity cost of P_b that should be accounted for in the contribution margin seen in square brackets in equation (1). As a result, profits are the sum of one term that involves only the basic price and another term that only involves the membership price.

The maximum membership price that a consumer would pay (the consumer with ideal x=0) is U+2S. The value of the service is counted twice because the club member gets the service in both periods, while the basic product utility is counted only once because in the first period, club members would have bought the basic product regardless. We assume that the utility of the basic product, U, is sufficiently large so that the entire market is covered; that is, the optimal monopoly membership price equals the willingness-to-pay for the consumer with the least congruent tastes (x=1). As seen in Figure 3, this membership price is $P_m^*=U+S$. By the same logic, the optimal basic price is $P_b^*=U-1$. Consequently, the sum of the club prices for both periods is $P_1+P_2=P_b^*+P_m^*=2U+S-1$.

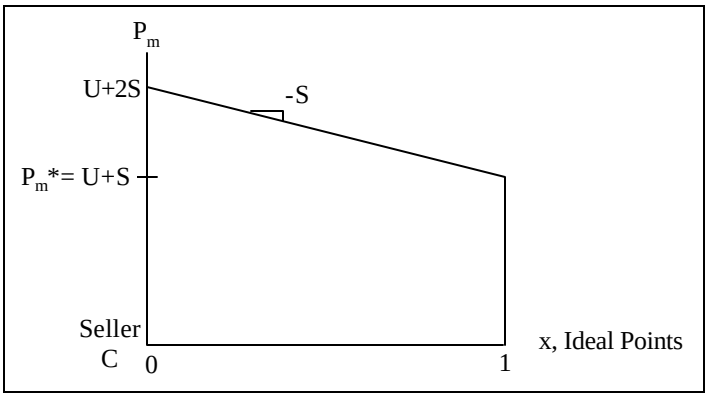

Figure 3: Monopolist's Demand for Club Membership

How this total club price is parceled out between the periods depends on when the personalized services are offered. In the retention strategy, the personalization occurs in period 2. Because personalization gives all consumers their ideal product, they have identical utility, and because there are no outside options for the club members, the seller can capture all utility with a period 2 price $P_2^{\langle r \rangle} = U+S$.[4] This implies that in period 1 (when less attractive service-augmented products are offered) the price must be $P_1^{\langle r \rangle} = U-1$. In the first period, the augmented product is priced the same as the basic product, and this implies that the monopolist covers the entire market with its club and makes no basic-only sales.

In the acquisition strategy, the personalization occurs in period 1 and this creates a situation that opportunistic consumers could exploit: join the club to consume personalized goods and service, but then refuse to pay the club price in period 2. The seller is presumed to recognize this vulnerability and to set prices so that opportunism is prevented. Specifically, the boundary between opportunistic and non-opportunistic consumers is the person who is just indifferent between buying and not buying in period 2, where $U-x+S(1-x)-P_2=0$, or $x = X_2$

[4] Superscript $\langle r \rangle$ or $\langle a \rangle$ refers to optimal values when the monopolist adopts retention or acquisition, respectively.

$\equiv \frac{U+S-P_2}{1+S}$. As previously mentioned, the person who is willing to join the club by paying a total price for club membership rather than by buying just the basic product is at the threshold $X_{12} \equiv \frac{U+2S-(P_1+P_2-P_b)}{S}$. To eliminate opportunism, these two thresholds must refer to one and the same person.

Substituting $P_1+P_2=2U+S-1$, and $P_b^*=U-1$ in X_{12} and solving the equation $X_{12}= X_2$ for P_2 gives the optimal second-period price, $P_2^{\langle a \rangle}=U-1$. This in turn gives, $P_1^{\langle a \rangle}=U+S$. Notice that the second-period price is smaller than the first-period price in order to mitigate opportunism, but the total across both periods still equals 2U+S-1. Also note that with these prices the club size for the acquisition strategy is $X_{12}^{\langle a \rangle} = X_2^{\langle a \rangle}=1$ and therefore, just as in the case of the retention strategy, there are no sales of only the basic product.

Comparing retention and acquisition strategies for a monopolist, acquisition CRM requires that special product-related activities occur only in period 1 and must therefore there must be a lower club price in period 2 to mitigate customer opportunism. Alternatively, the retention CRM seller performs special product-related activities in period 2, so it can afford to have higher prices then without the risk of losing the customer. In either case, the total price across both periods is identical and the profits of acquisition and retention CRM are identical when there is no churn in the market.

What about second-period churn for the monopolist? Recall that for exogenous reasons a fraction χ of the club members become disaffected with the seller and leave the club after period 1. We call the fractional parameter χ the "churn rate" and assume that it has the same value for both acquisition- and retention-oriented CRM. Because the monopolist's club covers the market,

the optimal profits are $p^{\langle r \rangle} = P_1^{\langle r \rangle} + (1 - ?)P_2^{\langle r \rangle}$ and $p^{\langle a \rangle} = P_1^{\langle a \rangle} + (1 - ?)P_2^{\langle a \rangle}$. As we have just shown, an acquisition-oriented seller will have a lower price than a retention-oriented seller in period 2 (to deal with its opportunistic consumers). As a result, the churn damages profits less for the acquisition-oriented seller than the retention-oriented seller. Substituting the optimal prices gives us the conclusion: $p^{\langle a \rangle} - p^{\langle r \rangle} = ?(1 + S) > 0$.

> **Theorem 1:** If a monopolist is in a market where consumers churn, it is more profitable to adopt an acquisition-CRM strategy than a retention-CRM strategy.

Given that we have set aside the issue of the cost of acquiring versus retaining customers, acquisition is the dominant strategy for a monopolist because it mitigates the opportunity losses due to churn. It is unclear that this logic carries over when firms have competitive rivals. Should both firms in a duopoly adopt acquisition or does competition force differentiated CRM strategies? This is the central research question and it is answered in the next section.

4. A Model of CRM Competition

In this main section of the paper we analyze the consequences of CRM sellers that compete with one another using acquisition or retention strategies. For each strategic choice, we need to analyze the competitive pricing of the basic and service-augmented products, given the consumers' decisions to join the buyer club or not. The outcome of this analysis is the profit that each firm earns based upon the strategic CRM situation.

In the previous section, we set aside manufacturing costs but here we denote the unit costs by C_b for the basic product and C_s for the augmented service. It will be assumed that some consumers are willing to pay this cost for the basic product and service: $U-C_b>0$ and $S-C_s>0$.

4.1 Both Sellers Use Retention: á r, rñ

Suppose that both sellers use a retention CRM strategy. In period 1, club members get a common product and service, and because each person has a different ideal point, club members have different valuations of the offering. However, in period 2 when the seller tries to retain customers by special treatment, the products and services for club members are personalized. Looking ahead to the special treatment, which customers want to join a club and which ones want to buy a basic product? These and related questions about the customers are answered by evaluating consumers' surpluses.

We will examine only seller C's offer in detail but a similar story applies to seller D. Seller C offers the basic product at a price P_{Cb} and invites customers to join the buyer club C. Club members will get the service-augmented product (that is, the basic product plus product related-services) in period 1 for a price P_{C1} and will get a "personalized" augmented product in period 2 for a price P_{C2}, as explained below. Recall that the augmented product differs from the consumer's ideal, so consumer surplus in period 1 is $CS_{C1} \equiv U-x+S(1-x)-P_{C1}$. In period 2, the retention strategy says that C offers to personalize the augmented product by making its attribute level x rather than 0. The resulting consumer surplus in period 2 equals $CS_{C2} \equiv U+S-P_{C2}$. Notice that this is identical for all club members due to personalization.

Some customers may decide that the basic product at a low price is their best choice in period 1. They are then ineligible for the personalized augmented product in the future and drop out of the market after the first period. Which customers want to join the club rather than just buy the basic product? This requires that the consumer surplus of club membership over both periods exceeds the consumer surplus with the basic product: $CS_{C12} \equiv U-x+S(1-x)-P_{C1}+ U+S-$

$P_{C2} \geq U-x-P_{Cb}$ or rearranging to solve for the ideal point, $x \leq (U+2S+P_{Cb}- P_{C1}- P_{C2})/S$, where we denote the threshold on the right hand side of this inequality by

$$X_{C12} \equiv (U+2S+P_{Cb}- P_{C1}- P_{C2})/S. \quad (2)$$

The consumer surpluses and thresholds are pictured in Figure 4. On the other hand, if the customer prefers a basic product, she prefers the one offered by seller C rather than the one offered by seller D when $CS_{Cb} \equiv U-x-P_{Cb} \geq U-(1-x)-P_{Db} \equiv CS_{Db}$ or $x \leq \frac{1}{2}(1+P_{Db}-P_{Cb})$, where we denote the threshold on the right hand side of this inequality by

$$X_b \equiv \frac{1}{2}(1+P_{Db}-P_{Cb}). \quad (3)$$

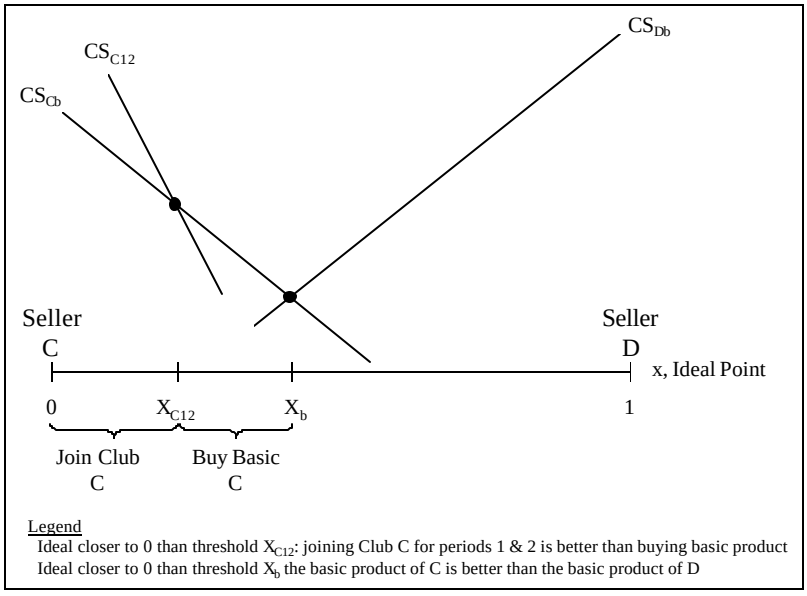
CS_{Db}
CS_{C12}
CS_{Cb}
Seller C
Seller D
x, Ideal Point
0
X_{C12}
X_b
1
Join Club C
Buy Basic C
Legend
Ideal closer to 0 than threshold X_{C12}: joining Club C for periods 1 & 2 is better than buying basic product
Ideal closer to 0 than threshold X_b the basic product of C is better than the basic product of D

Figure 4: Consumer Surpluses and Purchase Thresholds

As can be seen in Figure 4, the seller C can invite all the customers whose ideal points are below X_{C12} to join club C and they will accept and buy the augmented products both now and in the future. All the customers with ideal points between X_{C12} and X_{Cb} will buy the basic product now and then disappear from the market in the future. Customers with ideal points to the right of X_b will either buy the augmented or basic product from seller D.

In the second period, some customers churn between sellers, as follows. Suppose seller C has a buyer club consisting of all customers whose x is below X_{C12} and seller D has a buyer club consisting of all customers whose x is above X_{D12}. A fraction χ of club C members will switch to the seller D's club, but a fraction χ of seller D's club will switch to club C. In this section, we assume that the churn rate χ is a fixed parameter of the population of customers. The net number of people who will buy from firm C in period 2 is $(1-\chi)X_{C12}+\chi(1-X_{D12})$.

Given the uniform distribution of the ideal points across the unit interval, the profit that seller C will earn over both periods is composed of three parts. The club members (customers whose ideal points are below X_{C12}) buy the augmented product at a net margin $P_{C1}-C_b-C_s$ in period 1. In period 2, club members churn and all those that buy from seller C, $(1-\chi)X_{C12}+\chi(1-X_{D12})$, contribute a margin $P_{C2}-C_b-C_s$. Finally, the consumers who choose to buy only the basic product in period 1 contribute a margin $P_{Cb}-C_b$. The total profit for seller C equals,

$$\begin{aligned}\pi_C &= (P_{C1}-C_b-C_s)X_{C12}+(P_{C2}-C_b-C_s)[(1-\chi)X_{C12}+\chi(1-X_{D12})]+(P_{Cb}-C_b)[X_b-X_{C12}] \\ &=(P_{C1}-C_b-C_s)\left(\frac{U+2S+P_{Cb}-P_{C1}-P_{C2}}{S}\right)+(U+S-C_b-C_s)\left[(1-?)\frac{U+2S+P_{Cb}-P_{C1}-P_{C1}}{S}+?(1-X_{D12})\right]+ \\ &\quad +(P_{Cb}-C_b)\left(\tfrac{1}{2}(1+P_{Db}-P_{Cb})+\frac{U+2S+P_{Cb}-P_{C1}-P_{C2}}{S}\right).\end{aligned} \tag{4}$$

Seller C wants to maximize this profit through the three prices that are set. Recall that as long as the second period price does not exceed U+S, all club members will buy the personalized augmented product. As a result, the optimal price in period 2 is $P_{C2}=U+S$. Given this, the other optimal prices are determined by the first-order condition of π_C with respect to P_{C1} and P_{Cb}, and the Nash-equilibrium prices are found by noting that the symmetry of the problem implies that sellers have identical prices. The Nash-equilibrium prices when both sellers use retention are

$$P_{C1}^{\langle r,r\rangle}=P_{D1}^{\langle r,r\rangle}=1+C_b+C_s-\tfrac{1}{2}\left[(1-?)(U-C_b)-?(S-C_s)\right], \tag{5}$$

$$P_{C2}^{\langle r,r\rangle} = P_{D2}^{\langle r,r\rangle} = U + S, \text{ and} \quad (6)$$

$$P_{Cb}^{\langle r,r\rangle} = P_{Db}^{\langle r,r\rangle} = 1 + C_b.^{5} \quad (7)$$

The expression for the size of firm C's club in equilibrium, $X_{C12}^{\langle r,r\rangle}$, is given in the right column of Table 1. The number of basic customers is $X_b^{\langle r,r\rangle} - X_{C12}^{\langle r,r\rangle}$ for firm C. These values are legitimate only when market shares are positive, so in equilibrium we have to make sure that both the basic product and the augmented product for both the clubs have positive sales. The unit contribution margin of the basic product is 1 and the total contribution margin of each member of the club is $1 + \tfrac{1}{2}((1+\chi)(U - C_b) + (2+\chi)(S - C_s))$. Because the sellers' club sizes are equal in the ⟨r, r⟩ equilibrium, churn creates no differential advantage for either seller: as many customers arrive as leave in the churn. However, as the churn rate χ increases, both sellers raise their prices for their club as seen in equation (5). This seems puzzling, because churn seems like a decrease in demand. Recall that in period 2 with personalized augmented services, the firm is earning a very high profit margin (it charges a price equal to maximum willingness-to-pay, U+S). If the churn rate increases, more club members leave in period 2, making a club member slightly less profitable than before. Consequently, the seller raises the first-period price to reduce the size of the club. The arrival of new members from the other seller's club in period 2 is a windfall that does not affect pricing, just total profits.

Combining the number of buyers and the contribution margins gives the Nash equilibrium profits (see also the left column of Table 1):

$$p_C^{\langle r,r\rangle} = p_D^{\langle r,r\rangle} = \tfrac{1}{2} + \left(\frac{(1-?)(U - C_b) + (2-?)(S - C_s)}{2S}\right)\left[\frac{(1+?)(U - C_b) + (2+?)(S - C_s)}{2}\right]. \quad (8)$$

[5] The Nash-equilibrium values are denoted with a superscript $\langle \sigma_C, \sigma_D \rangle$ that specifies the CRM strategies chosen by sellers C and D, in this case ⟨r, r⟩. To keep the text uncluttered, all results are derived in a Technical Appendix.

4.2 Both Sellers Use Acquisition: á a, añ

Suppose that both sellers use an acquisition strategy. That is, they both provide personalized service-augmented products for club members in period 1. This leaves them vulnerable to opportunistic customers who might join the club now for the personalized product and then drop out in the second period when the augmented product is standardized, rather than personalized. We assume that the sellers can anticipate this behavior, and only offer invitations to those consumers who will buy in both periods.

Specifically, the consumer surplus is non-negative in period 2 when $CS_{C2}=U-x+S(1-x)-P_{C2}\geq 0$, or $x \leq (U+S-P_{C2})/(1+S)$, where we denote this threshold by

$$X_{C2}\equiv(U+S-P_{C2})/(1+S). \tag{9}$$

We assume that $X_{C2}\leq X_{C12}$, so there are customers who would join the buyer club C but not purchase the product in period 2. As a result, seller C only invites customers with x below X_{C2} to join the buyer club, knowing that others will act opportunistically. The profit seller C earns is

$$\pi_C=(P_{C1}-C_b-C_s)\left(\frac{U+S-P_{C2}}{1+S}\right)+(P_{C2}-C_b-C_s)[(1-\chi)\left(\frac{U+S-P_{C2}}{1+S}\right)+\chi(1-X_{D2})]+$$
$$(P_{Cb}-C_b)[\,\tfrac{1}{2}(1+P_{Db}-P_{Cb})-\left(\frac{U+S-P_{C2}}{1+S}\right)]. \tag{10}$$

Notice from equation (9) that changing the augmented price in period one has no effect on the number of customers that are invited to join the buyer club. Seller C can raise the first period price, increasing profits margins, without effecting demand until the constraint $X_{C2}\leq X_{C12}$ is binding. Therefore, the period 1 augmented price is determined by the equality $X_{C2}=X_{C12}$, or using equations (2) and (9),

$$P_{C1}= S+P_{Cb}+(U+S-P_{C2})/(1+S). \tag{11}$$

This is analogous to the second period price $P_{C2}=U+S$ in the retention ⟨r, r⟩ sub-game.

	Profits	Club Margins and Size
á**r,r**ñ	$\frac{1}{2}+\frac{(1-\chi)(U-C_b)+(2-\chi)(S-C_s)}{2S}\ \frac{(1+\chi)(U-C_b)+(2+\chi)(S-C_s)}{2}$	Club Margin: $1+\frac{1}{2}\left[(1+\chi)(U-C_b)+(2+\chi)(S-C_s)\right]$ Club Size: $\frac{1}{2S}\left((1-\chi)(U-C_b)+(2-\chi)(S-C_s)\right)$
á**a,a**ñ	$\frac{1}{2}+\left[(U-C_b)(S-?)+(S-C_s)((2-?)S-2?)\right]\left\{\frac{(1-?)(U-C_b)+(2-?)(S-C_s)}{\left((1+S)(1-?)-1+S\right)^2}\right\}$	Club Margin: $1+(U-C_b)\left(1-\frac{(1-\chi)S}{(1+S)(2-\chi)-2}\right)+(S-C_s)\left(1-\frac{\chi}{(1+S)(2-\chi)-2}\right)$ Club Size: $\frac{(2-\chi)(S-C_s)+(1-\chi)(U-C_b)}{(1+S)(2-\chi)-2}$
á**r,a**ñ	Firm using retention $\frac{1}{2}+\frac{(1-?)(U-C_b)+(2-?)(S-C_s)}{2S}\ \frac{(1+?)(U-C_b)+(2+?)(S-C_s)}{2}$ $+\ ?^2\ \frac{(1+S)}{2}\ \frac{(1-?)(U-C_b)+(2-?)(S-C_s)}{2S}\ \frac{U-C_b+S-C_s}{(1+S)(1-?)-1}$ Firm using acquisition $\frac{1}{2}+\frac{(1-?)(U-C_b)+(2-?)(S-C_s)}{2S}\ \frac{(1+?)(U-C_b)+(2+?)(S-C_s)}{2}$ $+\left(\frac{(1-?)(U-C_b)+(2-?)(S-C_s)}{2S}\ \frac{?(1+S)}{2}\right)^2\ \frac{1}{(1+S)(1-?)-1}$	Firm using retention Club Margin: Same as <r, r> Club Size: same as <r, r> Firm using acquisition Club Margin: $1+(U-C_b+S-C_s)\left(1-\frac{1-\chi}{4}\left(1+\frac{S}{(1+S)(1-\chi)-1}\right)\right)+(S-C_s)\left(1-\frac{1}{4}\left(1+\frac{S}{(1+S)(1-\chi)-1}\right)\right)$ Club Size: $\frac{(1-\chi)(U-C_b)+(2-\chi)(S-C_s)}{4S}\left(1+\frac{S}{(1+S)(1-\chi)-1}\right)$

Table 1: Profits and Club Margins and Sizes in Different Subgames

Legend: ⟨r,a⟩ means that seller C uses retention and seller D uses acquisition, etc.
χ is the churn rate; U and S are the values of the ideal product and service; C_b and C_S are the unit costs of the basic product and service.

Substitute price (11) into profit (10). To find the Nash equilibrium, we solve the resulting first-order conditions with respect to P_{C2} and P_{Cb}, and use the symmetry of firm prices:

$$P_{C2}^{\langle a,a\rangle} = P_{D2}^{\langle a,a\rangle} = U + S - (1+S)\frac{(1-?)(U-C_b)+(2-?)(S-C_s)}{(1+S)(1-?)-1+S}, \tag{12}$$

$$P_{Cb}^{\langle a,a\rangle} = P_{Db}^{\langle a,a\rangle} = 1 + C_b. \tag{13}$$

Back-substituting (12) and (13) into (11) gives the Nash equilibrium first-period augmented price

$$P_{C1}^{\langle a,a\rangle} = P_{D1}^{\langle a,a\rangle} = 1 + S + C_b + \frac{(1-?)(U-C_b)+(2-?)(S-C_s)}{(1+S)(1-?)-1+S}. \tag{14}$$

The contribution margin for the basic product is 1 while the contribution margin of a member of the buyer club is given in the right column of Table 1. Substituting (12) into (9) gives the expression for the size of C's buyer club, $X_{C2}^{\langle a,a\rangle}$, as also seen Table 1. Combining margins and demands, the Nash-equilibrium profits are

$$p_C^{\langle a,a\rangle} = p_D^{\langle a,a\rangle} = \tfrac{1}{2} + \left[(U-C_b)(S-?)+(S-C_s)((2-?)S-2?)\right] \times \left\{\frac{(1-?)(U-C_b)+(2-?)(S-C_s)}{((1+S)(1-?)-1+S)^2}\right\}. \tag{15}$$

4.3 Asymmetric Retention and Acquisition: á r, aî

Suppose that seller C uses a retention strategy and seller D use an acquisition strategy. Using the analysis of the two previous subsections, the Nash equilibrium prices are found by simultaneously maximizing seller C's profit with respect to P_{C1} and P_{Cb} and maximizing seller D's profit with respect to P_{D2} and P_{Db}, where the profits are

$$\begin{aligned}\pi_C &= (P_{C1}-C_b-C_s)(S+P_{Cb}-P_{C1})/S + (U+S-C_b-C_s)[(1-\chi)(S+P_{Cb}-P_{C1})/S+\chi(1-X_{D2})] \\ &\quad + (P_{Cb}-C_b)[\tfrac{1}{2}(1+P_{Db}-P_{Cb})-(S+P_{Cb}-P_{C1})/S],\end{aligned} \tag{16}$$

$$\begin{aligned}\pi_D &= (P_{D1}-C_b-C_s)(1-X_{D2})+(P_{D2}-C_b-C_s)[(1-\chi)(1-X_{D2})+\chi X_{C12})]+(P_{Db}-C_b)[X_{D2}-X_b] \\ &= \left(S+P_{Db}+\frac{U+S-P_{D2}}{1+S}-C_b-C_s\right)\left(\frac{U+S-P_{D2}}{1+S}\right)+(P_{D2}-C_b-C_s)\left[(1-\chi)\left(\frac{U+S-P_{D2}}{1+S}\right)+\chi X_{C12}\right]+ \\ &\quad (P_{Db}-C_b)\left[\frac{1-U+P_{D2}}{1+S} - \tfrac{1}{2}(1+P_{Db}-P_{Cb})\right].\end{aligned} \tag{17}$$

The Nash-equilibrium prices are

$$P_{Cb}^{\langle r,a\rangle} = P_{Db}^{\langle r,a\rangle} = 1 + C_b, \tag{18}$$

$$P_{C1}^{\langle r,a\rangle} = 1 + C_b + C_s - \frac{(1-?)(U-C_b) - ?(S-C_s)}{2}, \text{ and} \tag{19}$$

$$P_{D2}^{\langle r,a\rangle} = U + S - \frac{(1-?)(U-C_b) + (2-?)(S-C_s)}{4S} \quad \frac{(1+S)(1-?) - 1 + S}{(1+S)(1-?) - 1}(1+S). \tag{20}$$

Notice that (1+S)(1-χ)-1>0 by second-order conditions. Since P_{C2}=U+S and P_{D1}=S+P_{Db}+(U+S-P_{D2})/(1+S), the other Nash equilibrium prices are

$$P_{C2}^{\langle r,a\rangle} = U + S, \text{ and} \tag{21}$$

$$P_{D1}^{\langle r,a\rangle} = 1 + S + C_b + \frac{(1-?)(U-C_b) + (2-?)(S-C_s)}{4S} \quad \frac{(1+S)(1-?) - 1 + S}{(1+S)(1-?) - 1}. \tag{22}$$

Because prices are not identical for sellers, the sizes of the buyer clubs are different for retention and acquisition. The size of club D (the acquisition seller), $1 - X_{D2}^{\langle r,a\rangle}$, is given in Table 1 and exceeds C's club.[6] As a consequence of its larger buyer club, churn hurts the acquisition seller more than the retention seller: more members are at risk to churn.

The profit of the sellers at the equilibrium prices are

$$\begin{aligned} p_C^{\langle r,a\rangle} = {} & \tfrac{1}{2} + \left(\frac{(1-?)(U-C_b) + (2-?)(S-C_s)}{2S}\right)\left[\frac{(1+?)(U-C_b) + (2+?)(S-C_s)}{2}\right] \\ & + ?^2 \frac{(1+S)}{2}\left(\frac{(1-?)(U-C_b) + (2-?)(S-C_s)}{2S}\right)\frac{U - C_b + S - C_s}{(1+S)(1-?) - 1}, \end{aligned} \tag{23}$$

$$\begin{aligned} p_D^{\langle r,a\rangle} = {} & \tfrac{1}{2} + \left(\frac{(1-?)(U-C_b) + (2-?)(S-C_s)}{2S}\right)\left[\frac{(1+?)(U-C_b) + (2+?)(S-C_s)}{2}\right] \\ & + \left(\frac{(1-?)(U-C_b) + (2-?)(S-C_s)}{2S}\,\frac{?(1+S)}{2}\right)^2 \frac{1}{(1+S)(1-?) - 1}. \end{aligned} \tag{24}$$

[6] Interestingly, $X_{C12}^{\langle r,a\rangle} = X_{C12}^{\langle r,r\rangle}$. That is, when C is using retention, the size of its club is unaffected by whether its rival adopts retention or acquisition.

4.4 Nash Equilibrium CRM Strategies without Churn

Before analyzing the general case, suppose we begin by studying the outcome if there were no churn. Set χ=0, compare the equilibrium profits found in equations (8), (15), (23), and (24), and we see that the profits are identical.

> **Theorem 2**: When there is no churn in the market, the payoffs are identical for sellers whether they use a retention or an acquisition CRM strategy.

Why would a seller who provides personalized augmented services in period 1 see no change in profits when it switched to provide the personalized services in period 2? The basic answer is that customers are clever enough to see through CRM strategies. Getting personalized service today, means that you will not get it in the future: extra service and its price have been shifted around without changing the total amounts. As a consequence, all strategic CRM combinations, ⟨r, r⟩, ⟨r, a⟩, ⟨a, r⟩, and ⟨a, a⟩, are Nash equilibria.

4.5 Nash Equilibrium CRM Strategies with Churn

Now consider the general case where the churn rate is positive (but identical for retention and acquisition). The strategic game matrix is seen in Table 2.

Table 2
Payoffs with Churn in CRM Game

		Seller D: Retention	Seller D: Acquisition
Seller C	Retention	$p_C^{\langle r,r\rangle}=100, p_D^{\langle r,r\rangle}=100$	$p_C^{\langle r,a\rangle}=105, p_D^{\langle r,a\rangle}=101$
	Acquisition	$p_C^{\langle a,r\rangle}=101, p_D^{\langle a,r\rangle}=105$	$p_C^{\langle a,a\rangle}=103, p_D^{\langle a,a\rangle}=103$

Sources of profit formulas – ⟨r,r⟩: equation (8), ⟨a,a⟩: equation (15), ⟨r,a⟩ or ⟨a,r⟩: equations (23) and (24). Numerical values are based upon U=1645, S=1000=C_b=C_S, χ=0.20.

To identify the Nash-equilibrium requires a detailed comparison of the profits that result from the price competition between sellers C and D. Let us first look at the numerical values of profits in Table 2, computed from specific parameter values. Suppose the sellers consider first the ⟨a, a⟩ strategy pair (because acquisition is the most profitable strategy for a monopolist). However, if one seller changes to retention, its profits increase from 103 to 105. The rival who continues to use the acquisition strategy will see its profits drop slightly from 103 to 101, but it would not pay that rival to match its competitor's acquisition CRM strategy, for that would drive its profits down even further, from 101 to 100. This pattern is general, as shown below.

Suppose that seller C is committed to a retention strategy. What is the best reply to this by seller D: use a retention strategy (left column in Table 2) or acquisition strategy (right column in Table 2)? To answer this question, compare $p_D^{\langle r,r\rangle}$ to $p_D^{\langle r,a\rangle}$, profits given in equations (8) and (24). Recalling that (1+S)(1-χ)-1 is positive by second-order conditions and χ is positive by assumption that there is churn, it is easy to see that $\pi_D^{\langle r,a\rangle}$ equals $\pi_D^{\langle r,r\rangle}$ plus a positive term. That is, seller D's best reply to a rival using a retention CRM strategy is to use an acquisition CRM strategy. This eliminates ⟨r, r⟩ as a potential Nash-equilibrium.

Could the dual acquisition strategy ⟨a, a⟩ be a Nash-equilibrium? If seller D was using the CRM acquisition strategy, what is seller C's best reply? From equations (15) and (23), one can show that $p_C^{\langle r,a\rangle} > p_C^{\langle a,a\rangle}$ is mathematically equivalent to

$$\left(\frac{[1-\chi](U-C_b)+[2-\chi](S-C_s)}{4S}\right)\left(\frac{(1+S)(1-\chi)-1-S}{(1+S)(1-\chi)-1+S}\right)^2 \times \frac{[S-\chi](U-C_b)+[S-\chi+(1+S)(1-\chi)-1](S-C_s)}{[(1+S)(1-\chi)-1]} > 0. \tag{25}$$

Under the assumption that $S>1$, $0<\chi<1$, and the second-order condition $(1+S)(1-\chi)-1>0$, all of the terms in square brackets in (25) are positive, so the best reply to a rival's acquisition strategy is to choose retention. The main result of our analysis of CRM competition with customer churn is that firms are forced to differentiate their customer relationship marketing strategies with one of them adopting acquisition and the other adopting retention.

> **Theorem 3**: The Nash equilibria of the CRM game with customer churn are asymmetric, $\langle r, a\rangle$ or $\langle a, r\rangle$. One firm uses retention CRM and the other uses acquisition CRM.

The intuition for the asymmetric equilibrium depends critically on the effects of customer churn. If seller D is committed to an acquisition strategy, then it is optimal for firm C to adopt a retention strategy because C receives a windfall in the customer churn. Due to identical churn rates, C loses some consumers to D but gains many more because D had acquired a larger club and therefore more customers to lose. These extra churn customers are extremely profitable as C does not even have to cut its price to attract them. This windfall will disappear if C responds to D's acquisition strategy with acquisition, and thus C will choose retention.

Suppose firm C adopts a retention strategy. Firm D is left to choose between an acquisition strategy resulting in a larger club or a retention strategy resulting in a higher margin. If D chooses an acquisition strategy it will face the problem of consumers' opportunism whereby some consumers will join the club only for the personal treatment given in the first period. To mitigate opportunism, firm D raises its first-period price and lowers its second-period price compared to a retention strategy. Thus, the club contribution margin in an acquisition strategy is slightly lower than that in a retention strategy but each additional member attracted to the club will purchase in two periods as opposed to purchasing the basic product in only one period.

Consequently, the benefit of having a larger club outweighs the loss in margin, and it is therefore optimal for firm D to respond to C's retention strategy with an acquisition strategy.

In the model presented in section 3, we saw that acquisition was the most profitable form of CRM for a monopolist. This is not true in the competitive case where a seller is confronted with a rival. Comparing the profits in equations (23) and (24), the firm which uses retention has higher profits.

> **Theorem 4**: In competitive equilibrium, the retention CRM strategy is more profitable than the acquisition CRM strategy.

There is a race to be the firm that uses the retention strategy, under the assumption that the other firm will choose a different CRM strategy. The retention CRM seller gains more customers from the churn of the large acquisition club than it loses in churn from its own small retention club. In the case of a monopoly firm, this windfall did not occur.

It is not clear which symmetric subgame yields the higher profits. One can show that the profits in the $\langle a, a\rangle$ strategic pair exceed the profits in the $\langle r, r\rangle$ pair.[7] If by mistake both firms aggressively insist on using a retention strategy, the profits are lower than any other strategic choice, as seen in Table 2.

Note the critical role of customer churn in eliminating the subgames with symmetric strategies, $\langle r, r\rangle$ and $\langle a, a\rangle$. Churn forces the firms to adopt asymmetric strategies in equilibrium. In the absence of churn, a firm would be indifferent between acquisition and retention regardless of what its rival chooses. However, with customer churn, a firm facing a rival's acquisition strategy not only optimally replies with a retention strategy but by doing so earns higher profit than its acquisition-oriented rival.

[7] See proof of Theorem 4 in the Technical Appendix.

In the above situation, the churn rate χ was assumed identical in both acquisition and retention CRM. We next analyze the situation where consumers who are immediately treated as special by an acquisition-oriented seller (rather than at the last minute after disaffection has developed, as in the retention-oriented CRM) produce lower churn rates.

5. CRM Competition when Churn is Asymmetric

Up to this point in the paper the rate of customer churn, ? , is the same regardless of whether firms adopt a retention or an acquisition strategy in the first period. However, if providing special services early on helps build a sense of commitment to the firm, then an acquisition strategy may cause lower churn than a retention strategy. Our goal in this section is to demonstrate that if there is lower churn with an acquisition strategy, then the Nash equilibrium of the first-period strategic game is $\langle a, a \rangle$. To make our point we consider an extreme situation where there is no churn when firms use an acquisition strategy, but the churn is ? >0 when they use a retention strategy.

> **Theorem 5:** Suppose there is no churn for a firm that uses an acquisition strategy but the churn rate with a retention strategy is positive. Then $\langle a, a \rangle$ is a Nash-equilibrium.

As seen in the model in the previous subsection, as long as customer churn rate is independent of the firms' CRM strategies but caused by such factors as variety seeking, consumer dissatisfaction with customer-service, or miswanting, $\langle a, a \rangle$ can never be an equilibrium. However, if churn rate is reduced by excellent treatment by a firm using acquisition CRM, then $\langle a, a \rangle$ can be an equilibrium.

6. A Consumer Surplus Theorem

An interesting implication of our model comes from an examination of the surplus of customers as a function of churn rate, when a firm adopts a retention strategy under competition. Let us consider firm C. Consider a customer whose ideal product located at x such that she is in the 'buyer club' of firm C. We can see from sections 4.1 and 4.3 that if C faces competition in the CRM market, then regardless of D's choice of acquisition or retention, C's Nash equilibrium prices are the same. The first-period surplus of the customer at x is u +V(1-x)-x- $P_{C1}^{\langle r,s_D\rangle}$, where σ_D is D's strategy set {r, a}. Since the second-period surplus of all customers in a retention strategy is zero, this is the total surplus. From subsections 4.1 and 4.3, the first-period price is $P_{C1}^{\langle r,s_D\rangle} = 1 + C_b + C_s - \frac{1}{2}[(1-c)(U-C_b) - c(S-C_s)]$, and it is easy to see that, $P_{C1}^{\langle r,s_D\rangle}$ increases in the churn rate χ. Moreover, the optimal profit of the retention firm, $p_C^{\langle r,s_D\rangle}$, decreases in χ. These facts directly lead us to the following result.

> **Theorem 6:** Suppose a firm adopts a retention strategy in competitive equilibrium. Both the firm and its club members are better-off when the churn rate is lower.

The result that consumers are better off under lower churn has implications for the relationship between firm and consumer. Churn in our model is exogenous and can be caused by changes in preferences, variety-seeking, or anything else that may cause consumers to switch sellers. In that sense, churn is a measure of the strength of the relationship between the firm and its customers. Said differently, if customers took into account the consequences of their variety-seeking behavior in situations where firms adopt relationship marketing, they might consciously curb such behavior and both firm and customer could be 'bound' in a mutually beneficial relationship. This provides an economic rationale for committed relationships between firms and

customers in such a way that lower variety-seeking by the customer is rewarded by the firm. In the limit, as $c \to 0$ and the relationship becomes exclusive, *both* firms and customers derive the maximum benefit from retention-oriented CRM. It is also a desirable property of the model that this result holds for a retention-oriented firm, since a retention strategy, by promising future rewards, begs the question of why consumers should trust their supplier.

7. Conclusion

This research investigates the strategic effects that occur when firms compete for customers using CRM strategies. Specifically, we model a situation where two firms simultaneously decide whether to adopt a retention strategy or an acquisition strategy, and ask, "What is the equilibrium CRM outcome?" In keeping with the spirit of long-term relationships between firm and customer, our model has two periods with firms forming 'buyer clubs' in the first period and offering to augment their base products only for club members. We operationalize acquisition and retention strategies by assuming that the augmented product can be personalized to the individual tastes of customers and the firm can choose to provide such personalization early on to recruit the maximum number of customers in its club (acquisition), or later to prevent consumers from leaving their clubs (retention). Our model incorporates the churn of consumers from one seller to the other because of unexpected bad experiences, variety-seeking or change in preferences.

We find that a monopolist earns higher profit by adopting acquisition rather than retention. This result holds because an acquisition strategy faces opportunism from consumers who want the personalized product in the first period and then prefer to drop out. An attempt to combat opportunism leads a monopolist to have a lower second-period price if it adopts

acquisition than if it were to adopt retention. But this implies that a retention strategy, by losing higher-paying consumers to second-period churn, is hurt more by churn than the acquisition strategy. In contrast to a monopolist, a retention-oriented firm facing competition can actually turn consumer churn to its advantage at the expense of its acquisition-oriented rival. In other word, under competition, not all firms should adopt acquisition.

The main result in the paper finds that under competition, symmetric firms will adopt asymmetric CRM strategies in equilibrium, with one firm adopting a retention strategy and its rival adopting an acquisition strategy. This result depends critically on customer churn. An acquisition strategy attracts more consumers to a firm's 'buyer club' compared to a retention strategy. This implies that, in responding to a rival's acquisition strategy, a firm can benefit from churn *only when* it chooses a retention strategy. This is because an acquisition-oriented firm, by having a larger club size, loses more customers than a retention-oriented firm and this windfall can be exploited by the latter. This benefit is large enough that, in the asymmetric equilibrium, the firm which adopts retention earns higher profit than its rival that adopts acquisition. In sum, a monopolist should adopt acquisition but should be the first to switch to retention when it faces competitive threat.

Can both competitors adopting an acquisition strategy ever be an equilibrium? Yes. The above results assume that churn is the same whether firms adopt acquisition or retention. However, if providing special services early on helps build customers' sense of commitment to the firm, then an acquisition strategy may cause lower churn than a retention strategy. In that case, it is always a Nash equilibrium for both firms to pursue an acquisition strategy.

Lastly, we show that consumers of the firm that adopts a retention strategy are better off when there is lower churn. Higher churn is reflected in a higher first-period price for the

retention firm, and this has a negative impact on consumers' surplus. Conversely, in the limit of zero churn, *both* firms and consumers receive the maximum benefits. Since churn is a measure of the strength of the relationship between a firm and its customers, this argues for an exclusive relationship between the two. Thus we provide an economic rationale for such relationships between consumers and CRM providers.

An interesting extension of this research would be to investigate what the competitive equilibrium will be when consumers are myopic. In this case, consumers would make the decision to join a firm's club by comparing only their first-period utility from joining the club to their utility from buying the basic product. With farsighted firms, such an analysis would allow one to study if the different rates at which consumers and firms discount the future has any bearing on the equilibrium CRM outcome (Villas-Boas 1999).

References

Ayers, Jean. 2003. Do You Really Know What to Do with Your Customer Data? *Harvard Management Update* 3-5.

Blattberg, Robert and John Deighton. 1996. Manage Marketing by the Customer Equity Test. *Harvard Business Review.* July-August 136-144.

Boulding, William, Richard Staelin, Michael Ehret and Wesley Johnston. 2005. A Customer Relationship Management Roadmap: What is Known, Potential Pitfalls, and Where to Go. *Journal of Marketing*. **69**(October) 155-166.

Cao, Yong and Thomas Gruca. 2005. Reducing Adverse Selection Through Customer Relationship Management. *Journal of Marketing.* **69**(October) 219-229.

Day, George. 2000. Capabilities for Forging Customer Relationships. *Marketing Science Institute: Working Paper Series*. Report number 00.118.

Day, George. 2002. Winning the Competition for Customer Relationships. Working paper, University of Pennsylvania. October.

Dewan, Rajiv, Bing Jing and Abraham Seidmann. 2003. Product Customization and Price Competition on the Internet. *Management Science.* **49**(8) 1055-1071.

Dowling, Grahame W. 2002. Customer Relationship Management: In B2C Markets Often Less is More. *California Management Review.* **44**(Spring) 87-104.

Dowling, Grahame and Mark Uncles. 1997. Do Customer Loyalty Programs Really Work? *Sloan Management Review*. **38**(4) 71-82.

Fournier, Susan, Susan Dobscha and David Glen Mick. 1998. Preventing the Premature Death of Relationship Marketing. *Harvard Business Review.* January-February 27-36.

Hart, Christopher W. L., James L. Heskett and W. Earl Sasser Jr. 1990. The Profitable Art of Service Recovery. *Harvard Business Review.* **68**(4) July-August 148-156.

Jaychandran, Satish, Subhash Sharma, Peter Kaufman and Pushkala Raman. 2005. The Role of Relational Information Processes and Technology Use in Customer Relationship Management. *Journal of Marketing*. **69**(October). 177-192.

Kim, Byung-Do, Mengze Shi, and Kannan Srinivasan. 2001. Reward Programs and Tacit Collusion. *Marketing Science.* **20**(2) 99-120.

Lewis, Michael. 2005. Incorporating Strategic Consumer Behavior into Customer Valuation. *Journal of Marketing.* **69**(October) 230-238.

Loveman, Gary. 2003. Diamonds in the Data Mine. *Harvard Business Review*. May 1-7.

McGahan, A. M. and Pankaj Ghemawat. 1994. Competition to Retain Customers. *Marketing Science.* **13**(2) 165-176.

Mithas, Sunil, M. S. Krishnan and Claes Fornell. 2005. Why do Customer Relationship Management Applications Affect Customer Satisfaction? *Journal of Marketing*. **69**(October) 201-209.

Morgan, Robert M. and Shelby D. Hunt. 1994. The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing*. **58**(July) 20-38.

Neff, Jack. 2005. Why Some Marketers Turn Away Customers. *Advertising Age*. February 14 1.

Payne, Adrian and Pennie Frow. 2005. A Strategic Framework for Customer Relationship Management. *Journal of Marketing*. **69**(October) 167-176.

Reichheld, Frederick F. and W. Earl Sasser Jr. 1990. Zero Defections: Quality Comes to Services. *Harvard Business Review.* **68**(5) September-October 105-111.

Reinartz, Werner J. and V. Kumar. 2000. On the Profitability of Long-life Customers in a Non-contractual Setting: An Empirical Investigation and Implications for Marketing. *Journal of Marketing.* **64**(October) 17-35.

Reinartz, Werner J. and V. Kumar. 2003. The Impact of Customer Relationship Characteristics on Profitable Lifetime Duration. *Journal of Marketing* **67**(January) 77-99.

Rigby, Darrell K. and Dianne Ledingham. 2004. CRM Done Right. *Harvard Business Review.* November 2-14.

Rigby, Darrell K., Frederick F. Reichheld and Phil Schefter. 2002. Avoid the Four Perils of CRM. *Harvard Business Review.* February 16-26.

Rogers, Martha. 2005. Customer Strategy: Observations from the Trenches. *Journal of Marketing*. **69**(October) 262-263.

Sharp, Byron and Anne Sharp. 1997. Loyalty Programs and Their Impact on Repeat-Purchase Loyalty Patterns. *International Journal of Research in Marketing.* **14**(5) 473-486.

Shugan, Steven M. 2005. Brand Loyalty Programs: Are They Shams? *Marketing Science*. **24**(2) 185-193.

Syam, Niladri B., Ranran Ruan and James D. Hess. 2005. Customized Products: A Competitive Analysis. *Marketing Science.* **24**(4) 569-584.

Syam, Niladri B. and Nanda Kumar. 2005. On Customized Goods, Standard Goods and Competition. *Marketing Science.* Forthcoming.

Syam, Niladri B., Partha Krishnamurthy and James D. Hess. 2005. That's What I Thought I Wanted? Models of Miswanting and Regret of Custom Products*. Working paper*, University of Houston.

Thomas, Jacquelyn S., Werner Reinartz and V. Kumar. 2004. Getting the Most out of Your Customers. *Harvard Business Review.* July-August 1-8.

Verhoef, Peter C. 2003. Understanding the Effect of Customer Relationship Management Efforts on Customer Retention and Customer Share Development. *Journal of Marketing.* **67**(October) 30-45.

Winer, Russell S. 2001. A Framework for Customer Relationship Management. *California Management Review.* **43**(4) 89-105.

Villas-Boas, J. Miguel. 1999. Dynamic Competition with Customer Recognition. *RAND Journal of Economics* **30**(4) 604-631.